



# RCRA Corrective Action Corrective Measures Study

**BACKGROUND:** On October 7, 1999, EPA announced its decision to withdraw most of the provisions of the July 27, 1990, Notice of Proposed Rulemaking (NPRM) for corrective action for solid waste management units (SWMUs) at hazardous waste management facilities (64 *FR* 54604). Commonly known as the Subpart S proposed rule, this rule would have created a comprehensive set of requirements under 40 *CFR* Part 264, Subpart S of the Resource Conservation and Recovery Act (RCRA) regulations, for conducting corrective action at RCRA facilities. To implement RCRA corrective action, EPA is deferring instead to:

- ❑ the February 16, 1993, final rule on Corrective Action Management Units (CAMUs) and Temporary Units (TUs) (58 *FR* 8658) and the January 22, 2002, CAMU Amendments (67 *FR* 2962);
- ❑ the May 1, 1996, Advance Notice of Proposed Rulemaking (ANPR) on RCRA corrective action (61 *FR* 19432);
- ❑ the November 30, 1998, final rule on Hazardous Remediation Waste Management Requirements (HWIR-Media) (63 *FR* 65874);
- ❑ Completion of Corrective Action Activities at RCRA Facilities (68 *FR* 8757); and
- ❑ various policy and guidance documents that EPA has issued since the 1990 Subpart S proposal.

In addition, EPA may issue one or more final rules pertaining to targeted jurisdictional issues, such as the definition of the term “facility” for purposes of RCRA corrective action, and supplemental guidance documents in a number of areas pertaining to RCRA corrective action.

The RCRA corrective action program was mandated by the Hazardous and Solid Waste Amendments of 1984 (HSWA). Congress directed EPA to require “corrective action for all releases of hazardous waste or constituents from any solid waste management unit...” [HSWA 3004(u)] and, where necessary, “that corrective action be taken beyond the facility property boundary...” [HSWA3004(v)]. The purpose of this Information Brief is to provide information on the Corrective Measures Study (CMS), which entails identification and evaluation of remedial alternatives. This Information Brief is one of a series on RCRA corrective action. It has been revised from a previous Information Brief (EH-231-047/1194, November 1994).

**STATUTES:** RCRA, as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA).

## REGULATIONS:

- ❑ Proposed 40 *CFR* Part 264, Subpart S [“Corrective Action for Solid Waste Management Units (SWMUs) at Hazardous Waste Management Facilities”, 55 *FR* 30798, July 27, 1990], withdrawn on October 7, 1999 (64 *FR* 54604);
- ❑ “Corrective Action Management Units and Temporary Units: Corrective Action Provisions Under Subtitle C” (58 *FR* 8658, February 16, 1993);
- ❑ Advanced Notice of Proposed Rulemaking (ANPR) “Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities” (61 *FR* 19432, May 1, 1996);
- ❑ “Hazardous Remediation Waste Management Requirements” (HWIR-Media) (63 *FR* 65874, November 30, 1998);
- ❑ “Land Disposal Restrictions Phase IV Final Rule” (63 *FR* 28556, May 26, 1998);
- ❑ “Amendments to the Corrective Action Management Unit Rule” (67 *FR* 2962; January 22, 2002);
- ❑ “Announcement of Availability and Request for Comment on ‘Completion of Corrective Action Activities at RCRA Facilities’ Guidance” (67 *FR* 9174; February 27, 2002).

## **What is a CMS?**

A corrective measures study (CMS) involves the identification and evaluation of remedial alternatives (i.e., remedies) for performing corrective action at one or more solid waste management units (SWMUs) at a RCRA facility. It is prepared by the facility owner/operator with guidance or oversight from EPA or an authorized State. If required to perform a CMS, an owner/operator identifies, evaluates and recommends one or more specific remedies that will remediate releases based on a evaluation of applicable data and available corrective measures technologies.

In the proposed Subpart S rule (July 1990), which was withdrawn by EPA (64 *FR* 54604, October 7, 1999), the CMS was proposed as the third phase in the execution of corrective action under RCRA. The ANPR (61 *FR* 19432, May 1996) however, stresses that in some cases, CMSs do not need to be performed (i.e., where the choice of a remedial alternative is relatively clear), or that the CMS can be tailored to focus on a limited set of plausible remedies only.

In addition, the ANPR stresses that the CMS should not be viewed as an isolated step in a linear process, and that the CMS can be performed concurrent with other activities [e.g., the RCRA facility investigation (RFI)]. A CMS is analogous to a feasibility study (FS) conducted for remedial actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)<sup>4</sup>.

## **What triggers the requirement to perform a CMS?**

First, it is recommended that the circumstances under which a CMS would be required should be established up-front as part of the permit or order documentation (e.g., schedule of compliance). For example,

the establishment of action levels as part of the permit schedule of compliance would provide a reference point for determining if a CMS is required. Action levels are media-specific, health-, and environmental-based contaminant concentrations considered protective of human health and the environment. They are typically very conservative, and hence if there is no exceedance of these levels, one can be reasonably certain that the SWMU or SWMUs in question will not pose an unreasonable risk to human health or the environment.

By establishing criteria for the conduct of a CMS as part of the permit or order documentation, facilities would understand up-front those occurrences that trigger a CMS and may then begin the evaluation independent of or concurrent with other facility RCRA corrective action activities.

An owner/operator will typically be required to perform a CMS under two different sets of circumstances. First, a CMS would be required if the regulator determines that concentrations of hazardous constituents in contaminated media (i.e., groundwater, surface water, soils, or air) exceed one or more action levels set for these constituents. Second, a CMS may even be required when hazardous constituent concentrations are below action levels. For example, a CMS may be required if concentrations of hazardous constituents may pose a threat to human health or the environment, given site-specific exposure conditions, or if the presence of multiple contaminants might cumulatively impact human health or the environment.

## **What is the objective of a CMS?**

The objective of a CMS is to identify and evaluate alternative remedies and to recommend a remedy(s) for remediation of a contaminated SWMU or SWMUs. In

accordance with the 1996 ANPR (61 *FR* 19432), the CMS does not necessarily have to address all potential remedies. The focus should be on those remedies that would be most appropriate considering site-specific factors. To achieve this objective, the CMS should consider all of the available data and site-specific information to select among the available alternatives.

### **What is the scope of a CMS?**

As indicated in the May 1996 ANPR (61 *FR* 19432), the scope of a CMS should be tailored to the situation being assessed. A CMS may be used to evaluate multiple remedial technologies or may focus on the most feasible alternatives. In some cases, for example where a presumptive remedy is applicable, a CMS may only evaluate one remedy. In this case, the CMS would be designed to confirm that the presumptive remedy is indeed appropriate.

The CMS should always be tailored to address the extent and nature of contamination at the facility, and should never be broader than it needs to be. In addition, it is not necessary that one CMS be performed to encompass all SWMUs and all contaminated media at a facility. The CMS may be tailored to a single SWMU, groupings of SWMUs, or to specific environmental media at one or more SWMUs.

Remedies that are evaluated and compared in the CMS should address a number of elements, as appropriate. These include:

- ❑ An evaluation of performance reliability, ease of implementation, and potential impacts of one or more potential remedies;
- ❑ an assessment of the effectiveness of potential remedies in achieving adequate control of sources and cleanup of the

hazardous waste and hazardous waste constituents released from SWMUs;

- ❑ an assessment of the time required to begin and complete the remedy;
- ❑ an assessment of the costs of remedy implementation; and
- ❑ an assessment of institutional requirements (e.g., State or local permit requirements) which may substantially affect implementation of the remedy.

The above items are derived from the July 1990 Subpart S proposed rule (proposed 40 *CFR* 264.522). Although withdrawn, these elements from the proposed Subpart S rule are nevertheless appropriate to the CMS. Other factors may be evaluated as well. The key is flexibility and tailoring the CMS to the SWMU(s), contaminated environmental media and most feasible remedies.

### **Are there circumstances under which a formal CMS evaluation is not required?**

The EPA indicates in the 1996 ANPR (61 *FR* 19432), that a formal CMS evaluation is not always necessary. The ANPR indicates that, if a performance-based approach to corrective action is taken, the CMS report may not need to be submitted to an overseeing agency for review and approval. In a performance-based approach, remedial goals would be established by the overseeing agency, and after the remedial goals undergo public review and comment, the facility would be permitted to design and implement a remedy that will meet remedial goals without direct agency oversight.

The EPA further indicates in the ANPR (61 *FR* 19432) that it would favor a performance-based approach provided that the remedial goals that are established for a facility are clear, the oversight during

remedy implementation is appropriate to the complexity of the facility-specific circumstances, and the public is substantially involved.

### **What reports are associated with the performance of a CMS?**

The regulator may require that the owner/operator submit periodic progress reports during the implementation of a CMS. Based on the information in these reports, the regulator may require the owner/operator to modify the scope of the CMS. Upon completion of the CMS, the owner/operator will typically submit a CMS report describing and evaluating the remedies assessed in relation to the criteria used in selecting a remedy (see below). However, under the performance-based approach (discussed above) submission of a CMS report, or progress reports, may not always be required.

### **What criteria is used to select a remedy?**

The EPA devotes considerable attention to remedy selection in the May 1996 ANPR (61 *FR* 19432). First, EPA indicates that it expects the facility to develop and recommend a remedy, or if a performance-based approach is used, to establish remedy performance standards, including media cleanup levels, points of compliance, and compliance time frames. The EPA further indicates, though, that the overseeing agency may reject the preferred remedial alternative or remedy performance standard, and prescribe a different alternative or performance standard. The overseeing agency may also request further analysis.

The EPA establishes a series of seven expectations for remedies as part of the May 1996 ANPR (61 *FR* 19432). These expectations are not binding requirements, but rather, they are intended to be used to

guide the development of remedial alternatives. The seven expectations are summarized below:

- ❑ Treatment should be used to address principle threats wherever practicable and cost-effective.
- ❑ Engineering controls, such as containment, should be used where wastes and contaminated media can be reliably contained, pose relatively low long-term threats, or for which treatment is impracticable.
- ❑ A combination of methods (e.g., treatment, engineering, and institutional controls) should be used, as appropriate, to protect human health and the environment.
- ❑ Institutional controls should be used primarily to supplement engineering controls as appropriate for short- or long-term management to prevent or limit exposure.
- ❑ Innovative technologies should be considered where such technologies offer potential for comparable or superior performance or implementability, less adverse impacts, or lower costs.
- ❑ Usable groundwater should be returned to maximum beneficial use wherever practicable.
- ❑ Contaminated soils should be remediated as necessary to prevent or limit direct exposure and to prevent the transfer of unacceptable concentrations of contaminants from soils to other media.

In addition to the above, EPA notes in the ANPR that the system proposed in the July 1990 proposed Subpart S rule for remedy selection remains appropriate as general goals for cleanup and screening tools for potential remedies (61 *FR* 19432). The



Subpart S proposal established a two-phased evaluation for remedy selection. During the first phase, potential remedies are screened to determine if they meet four threshold criteria. Remedies that meet these threshold criteria are then evaluated using five balancing criteria to identify the remedy that provides the best relative combination of attributes.

The four threshold criteria for remedy selection are summarized as:

- ❑ It must be protective of human health and the environment;
- ❑ it must attain applicable media cleanup standards;
- ❑ it must control the source(s) of releases so as reduce or eliminate further releases of hazardous wastes and hazardous constituents that may pose a threat to human health and the environment; and
- ❑ it must comply with applicable standards for waste management.

The five balancing criteria are summarized as:

- ❑ Long-term reliability and effectiveness;
- ❑ degree of reduction of toxicity, mobility, or volume of wastes;
- ❑ short-term effectiveness;
- ❑ implementability; and
- ❑ cost.

### **What are some of the other factors that should be considered in the remedy selection process?**

The May 1996 ANPR goes on to describe a number of important considerations in

identifying and selecting potential remedies (61 *FR* 19432). These include:

- ❑ balancing treatment and exposure controls,
- ❑ establishing media cleanup standards,
- ❑ identifying point(s) of compliance,
- ❑ establishing compliance time frame(s),
- ❑ performing site-specific risk assessments,
- ❑ evaluating ecological risk,
- ❑ determining technical impracticability, considering natural attenuation alternatives, and
- ❑ considering present and future land use.

Other factors which may be considered in the remedy selection process include the schedule for implementing corrective measures, the designation of corrective action management units (CAMUs) and temporary units (TUs), the need for phased or conditional remedies, and the ability of alternative remedies to meet media cleanup standards.

Chapter 5 of DOE's *RCRA Corrective Action Program Guide*<sup>1</sup> provides additional information about these aspects of the remedy selection process. DOE has produced a number of guidance materials (see references) which may be reviewed for additional information on the CAMU/TU final rule.

Note, however, that EPA's hazardous waste identification rule for media (HWIR-Media), finalized on November 30, 1998, revised the definition of CAMU and should be reviewed for additional information (63 *FR* 65874). Furthermore, the CAMU Amendments (67 *FR* 2962; January 22, 2002) establishes

provisions for “Grandfathered CAMUs,” and subjected other CAMUs to more detailed design, operating and treatment standards, and limits them to managing a subcategory of remediation waste termed “CAMU-eligible waste.”

## What happens once a CMS is completed?

Upon selection of the remedy, the regulator will modify the facility permit or 3008(h) Order to require implementation of the remedy.

Corrective measures implementation (CMI) would proceed through a planning phase, with subsequent implementation and progress reporting. Corrective measures would cease for the entire or less than the entire facility when established remedy expectations have been achieved, supporting documentation has been submitted and EPA modifies the permit or order to incorporate a determination of no further action. that:

- ❑ the remedy has been implemented successfully and no further activity or controls are necessary to protect human health and the environment (corrective action complete determination) or
- ❑ all that remains is performance of required operation and maintenance and monitoring actions, and/or compliance with and implementation of any institutional controls (i.e., corrective action complete with controls determination)<sup>5</sup>.

## References

- [1] *RCRA Corrective Action Program Guide (Interim)*, U.S. Department of Energy, Office of Pollution Prevention and Resource Conservation Policy and Guidance (EH-43), Guidance Manual, DOE/EH-0323, May 1993.
- [2] *Amendments to the Corrective Action Management Unit Rule; Final Rule (67 FR 2962)*, U.S. Department of Energy (DOE), Office of Pollution Prevention and Resource Conservation Policy and Guidance (EH-43), Regulatory Bulletin, January 2003.
- [3] *A Comparison of the RCRA Corrective Action and CERCLA Remedial Action Process*, U.S. Department of Energy, Office of Pollution Prevention and Resource Conservation Policy and Guidance (EH-43), publication DOE/EH-0365, February 1994.
- [4] *Corrective Action Management Units and Temporary Units*, U.S. Department of Energy, Office of Pollution Prevention and Resource Conservation Policy and Guidance (EH-43), RCRA Information Brief, EH-43-043r, January 2000.
- [5] “Final Guidance on Completion of Corrective Action Activities at RCRA Facilities” (68 FR 8757), U.S. Environmental Protection Agency, Office of Solid Waste, February 25, 2003.

Questions of policy or questions requiring policy decisions will not be dealt with in EH-43 Information Briefs unless that policy has already been established through appropriate documentation. Please refer any questions concerning the subject material covered in this Information Brief to:

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